

1-(meth)acryloyloxy-9-hydroxy-5-(meth)acryloyloxy carbazole.

Compounds having functional groups (acryl, methacryl, vinyl), substituents (halogen, lower alkyl, hydroxyl) and the organic groups  $M_6$ ,  $M_7$ :

2-Methyl-1, 9-divinylmethoxycarbazole, 3-hydroxy-1, 5, 9-trivinylethoxycarbazole, 1-chloro-2, 7-di(meth)acryloyloxyethoxycarbazole, 3, 7-dibromo-2, 8, 9-tri(meth)acryloyloxydiethoxycarbazole, 1, 9-di(meth)acryloyloxytrimethoxy-4-butylcarbazole, 3, 6, 9-tri(meth)acryloyloxytetramethoxy-1-hydroxycarbazole, 2-(meth)acryloyloxymethoxy-5-propyl-1-vinylcarbazole, 6-(meth)acryloyloxydimethoxy-9-ethyl-2-vinylcarbazole, 2-(meth)acryloyloxytripropoxy-9-(meth)acryloyloxymethoxycarbazole and 1-(meth)acryloyloxyethoxy-9-hydroxy-5-(meth)acryloyloxyethoxycarbazole.

These exemplified compounds can be used solely or in combination.

Among the above-mentioned compounds, N-vinylcarbazole, 3, 6-dibromo-9-vinylcarbazole and 9-vinylcarbazole are particularly preferable.

It is also possible to combine the respective exemplified compounds of the fluorene-based compound [I], the sulfide-based cyclic compound [II], the halogenated cyclic compound [III] and the carbazole-based compound [IV].

Among the fluorene-based compound [I], the sulfide-based cyclic compound [II], the halogenated cyclic compound [III] and the carbazole-based compound [IV], the fluorene-based compound [I], the sulfide-based cyclic compound [II] and the halogenated cyclic compound [III] are preferable, and the fluorene-based compound [I] and the halogenated cyclic compound [III] are the most preferable.

In the hologram recording material composition of the invention, the allyl-based prepolymer (A) (containing (D), if necessary) and the (meth)acrylate-based compound (B) are selected in such a manner that the difference between the refractive index of the former and the refractive index of the polymer of the latter is 0.005 or more, and preferably 0.01 or more. When the difference is less than 0.005, the formation of a hologram is substantially impossible. The difference is 1.0 at the most.

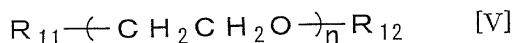
In the hologram recording material composition according to the present invention, a weight ratio of the allyl-based prepolymer (A) to the (meth)acrylate-based compound (B), (A) : (B) is from 5 : 95 to 95 : 5, preferably from 10 : 90 to 90 : 10, further preferably from 20 : 80 to 80 : 20, the most preferably from 30 : 70 to 70 : 30.

The hologram recording material composition according to the present invention can further comprise a viscosity reducing agent (E) other than the allyl-based prepolymer (A), the (meth)acrylate-based compound (B) and the photo-polymerization initiator (C). A weight ratio of the allyl-based prepolymer (A), the (meth)acrylate-based compound (B) and the viscosity reducing agent (E), (A) : (B) : (E) is 20 to 80 : 3 to 60 : 3 to 60, preferably 30 to 75 : 5 to 50 : 5 to 50. The viscosity reducing agent (E) is selected in such a manner that a difference between the refractive index of the polymer of the (meth)acrylate-based compound (B) and the weighted mean of those of the allyl-based prepolymer (A), the thermoplastic resin (D) and the viscosity reducing agent (E) is 0.01 or more.

When at least one radical polymerizable compound (b1) selected from the group consisting of the fluorene-based compound [I], the

sulfide-based cyclic compound [II], the halogenated cyclic compound [III] and the carbazole-based compound [IV] is used as the (meth)acrylate-based compound (B), it is desirable to use the viscosity reducing agent (E) simultaneously. Since the radical polymerizable compound (b1) is usually solid at ordinary temperature, it is difficult to obtain good diffraction efficiency unless the viscosity reducing agent (E) is used simultaneously. In particular, in recording of a reflection type hologram, the diffraction efficiency might be lowered, or it might be impossible to record the hologram.

Among the viscosity reducing agents, examples of compounds (e1) which are nonreactive on the (meth)acrylate-based compound (B) are inert compounds such as phthalates such as dimethyl phthalate and diethyl phthalate; aliphatic dibasic acid esters such as dimethyl adipate, dibutyl adipate, dimethyl sebacate and diethyl succinate; orthophosphates such as trimethyl phosphate, triethyl phosphate, triphenyl phosphate and tricresyl phosphate; acetates such as glyceryl triacetate and 2-ethylhexyl acetate; and phosphites such as triphenyl phosphite and dibutylhydrodiene phosphite. A further example thereof is alkylene glycol alkyl ether represented by the following general formula,



wherein  $R_{11}$  and  $R_{12}$  are alkyl having one to five carbon atoms, hydroxyl or acetyl, and "n" is an integer of 1 to 5.

Examples of the alkylene glycol alkyl ether are ethylene glycol